



University of Pennsylvania
ScholarlyCommons

Operations, Information and Decisions Papers

Wharton Faculty Research

5-2011

A Policy Maker's Dilemma: Preventing Terrorism or Preventing Blame

A. Peter McGraw

Alexander Todorov

Howard Kunreuther
University of Pennsylvania

Follow this and additional works at: http://repository.upenn.edu/oid_papers

 Part of the [Other International and Area Studies Commons](#), [Other Public Affairs, Public Policy and Public Administration Commons](#), and the [Policy History, Theory, and Methods Commons](#)

Recommended Citation

McGraw, A., Todorov, A., & Kunreuther, H. (2011). A Policy Maker's Dilemma: Preventing Terrorism or Preventing Blame. *Organizational Behavior and Human Decision Processes*, 115 (1), 25-34. <http://dx.doi.org/10.1016/j.obhdp.2011.01.004>

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/oid_papers/24
For more information, please contact repository@pobox.upenn.edu.

A Policy Maker's Dilemma: Preventing Terrorism or Preventing Blame

Abstract

Although anti-terrorism policy should be based on a normative treatment of risk that incorporates likelihoods of attack, policy makers' anti-terror decisions may be influenced by the blame they expect from failing to prevent attacks. We show that people's anti-terror budget priorities before a perceived attack and blame judgments after a perceived attack are associated with the attack's severity and how upsetting it is but largely independent of its likelihood. We also show that anti-terror budget priorities are influenced by directly highlighting the likelihood of the attack, but because of outcome biases, highlighting the attack's prior likelihood has no influence on judgments of blame, severity, or emotion after an attack is perceived to have occurred. Thus, because of accountability effects, we propose policy makers face a dilemma: prevent terrorism using normative methods that incorporate the likelihood of attack or prevent blame by preventing terrorist attacks the public find most blameworthy.

Keywords

Judgment, likelihood, risk, probability neglect, outcome bias, hindsight bias, terrorism, policy, blame

Disciplines

Other International and Area Studies | Other Public Affairs, Public Policy and Public Administration | Policy History, Theory, and Methods

**A policy maker's dilemma:
Preventing terrorism or preventing blame**

A. Peter McGraw
*Leeds School of Business
Univ. of Colorado, Boulder*
peter.mcgraw@colorado.edu

Alexander Todorov
*Woodrow Wilson School
Princeton University*
atodorov@princeton.edu

Howard Kunreuther
*The Wharton School
University of Pennsylvania*
kunreuther@wharton.upenn.edu

Working Paper # 2009-05-05

Risk Management and Decision Processes Center
The Wharton School, University of Pennsylvania
3730 Walnut Street, Jon Huntsman Hall, Suite 500
Philadelphia, PA, 19104
USA
Phone: 215-898-4589
Fax: 215-573-2130
<http://opim.wharton.upenn.edu/risk/>

THE WHARTON RISK MANAGEMENT AND DECISION PROCESSES CENTER

Established in 1984, the Wharton Risk Management and Decision Processes Center develops and promotes effective corporate and public policies for low-probability events with potentially catastrophic consequences through the integration of risk assessment, and risk perception with risk management strategies. Natural disasters, technological hazards, and national and international security issues (e.g., terrorism risk insurance markets, protection of critical infrastructure, global security) are among the extreme events that are the focus of the Center's research.

The Risk Center's neutrality allows it to undertake large-scale projects in conjunction with other researchers and organizations in the public and private sectors. Building on the disciplines of economics, decision sciences, finance, insurance, marketing and psychology, the Center supports and undertakes field and experimental studies of risk and uncertainty to better understand how individuals and organizations make choices under conditions of risk and uncertainty. Risk Center research also investigates the effectiveness of strategies such as risk communication, information sharing, incentive systems, insurance, regulation and public-private collaborations at a national and international scale. From these findings, the Wharton Risk Center's research team – over 50 faculty, fellows and doctoral students – is able to design new approaches to enable individuals and organizations to make better decisions regarding risk under various regulatory and market conditions.

The Center is also concerned with training leading decision makers. It actively engages multiple viewpoints, including top-level representatives from industry, government, international organizations, interest groups and academics through its research and policy publications, and through sponsored seminars, roundtables and forums.

More information is available at <http://opim.wharton.upenn.edu/risk>.

A policy maker's dilemma: Preventing terrorism or preventing blame

A. Peter McGraw

University of Colorado, Boulder

Alexander Todorov

Princeton University

Howard Kunreuther

University of Pennsylvania

Address correspondence to:

A. Peter McGraw

UCB 419

University of Colorado, Boulder

Boulder, CO 80309

303-735-3661

peter.mcgraw@colorado.edu

A. Peter McGraw is an Assistant Professor at the Leeds School of Business and the Department of Psychology and Neuroscience, UCB 419, University of Colorado, Boulder, CO 80309 (peter.mcgraw@colorado.edu).

Alex Todorov is an Assistant Professor at the Department of Psychology and the Woodrow Wilson School, 2-N-7 Green Hall, Princeton University, Princeton, NJ 08544 (atodorov@princeton.edu).

Howard Kunreuther is the Cecilia Yen Koo Professor of Decision Sciences & Public Policy at the Wharton School, 563 Huntsman Hall, 3730 Walnut St., University of Pennsylvania Philadelphia, PA 19104 (kunreuther@wharton.upenn.edu).

Special thanks to Danny Kahneman, Rebecca Wolfe, John Darley for valuable insights, discussions, and research assistance. We thank Elissa Guralnick, Leaf Van Boven, and Deborah Small for insightful comments and suggestions. We also thank Anna Cheung for her helpful research assistance and Christy Horber for research and editorial assistance.

Abstract

While anti-terrorism policy should be based on a normative treatment of risk, which balances the likelihoods and consequences of terrorist attacks, policy makers' decisions may be influenced by the blame they expect from the public for failing to prevent attacks. We show that people believe the government should emphasize likelihoods of attack when designing anti-terror policy, but people's anti-terror budget priorities before an attack and blame judgments after an attack are more strongly associated with their emotional reactions than the perceived likelihoods of attack. Moreover, blame is not easily deflected by policy makers. We show that drawing attention to likelihoods can influence people's anti-terror budget priorities before an attack but has no influence on their judgments of blame after an attack. Thus, we propose that policy makers face a dilemma: prevent terrorism using normative methods or prevent blame by preventing terrorist attacks the public would find most upsetting.

Word count: 148

Keywords: Judgment, Likelihood, Risk, Probability Neglect, Outcome Bias, Hindsight Bias, Terrorism, Policy, Blame, Emotion

A policy maker's dilemma: Preventing terrorism or preventing blame.

We examine a policy implication of the public's tendency to ignore likelihoods when blaming the government for failures to prevent terrorist attacks. In principle, the public believes that anti-terror policy should emphasize likelihoods of attack, but their emotional reactions to terrorist threats can override this consideration. We show that anti-terror policy preferences, judgments of blame, and emotional reactions to terrorist attacks are strongly associated in the public's judgments, whereas these judgments are not well predicted by perceived likelihoods of attack. The pattern persists even among experts: anti-terror policy preferences of decision analysts are well predicted by considerations of blame but not by perceived likelihoods.

Our findings reveal a potential challenge for anti-terror policy makers. The public tends to ignore likelihoods when judging anti-terror priorities before an attack and when casting blame on the government for failures after an attack. Thus, accountability to public opinion may tempt policy makers to minimize negative reactions of the public, which deviate from a normative treatment of risk that uses likelihoods of attack to weight potential consequences. Although policy makers could try to clarify their treatment of risk by informing the public of likelihoods of attack, we contend that such efforts will fail to reduce blame after an attack. We show that people can be persuaded to incorporate likelihoods into their anti-terror preferences, but blame is unaffected by informing people of prior likelihoods. As a result, we propose that the public's treatment of blame creates a dilemma for policy makers who want to base anti-terror policy on a normative treatment of risk.

Normative approaches to anti-terror policy

The events of September 11, 2001 led to unprecedented changes to U.S. government anti-terror policy. In the largest government restructuring in recent history, the United States created the Department of Homeland Security (DHS) primarily to “A) prevent terrorist attacks within the United States; B) reduce the vulnerability of the United States to terrorism; and C) minimize the damage, and assist in the recovery, from terrorist attacks that do occur within the United States” ([Homeland Security Act of 2002](#)). One of the many responsibilities of the DHS is the allocation of funds for the prevention of and response to terrorist attacks.

The DHS promotes a risk-focused approach to its budgeting activities by consulting experts regularly about the likelihood, vulnerability and consequences of various terrorist acts and how threats can be reduced. To assist in that endeavor the DHS, for example, has funded an interdisciplinary research center, the Center for Risk and Economic Analysis of Terrorism Events, at the University of Southern California. To guide a course of action, normative methods, such as decision analysis, weight the (dis)utilities of various terrorist acts by perceived likelihoods (Edwards, Newman, Snapper, & Seaver, 1982; Keeney, 1977, 1988). Game theory also provides methods for modeling not only the strategies of the terrorists but how those strategies would change based on the government’s anti-terror strategies (Sandler & Arce, 2003; Sandler & Lapan, 1988; Keohane & Zeckhauser, 2003; Bier, 2006).

The public appears, in principle, to support a normative approach to anti-terror policy. We presented undergraduates five strategies that the DHS could use for anti-terror policy and asked them to select the option that describes the process that the government should use when

making anti-terror policy decisions; percentage of respondents selecting each option is presented below ($N=60$):

- (17%) The DHS should budget to prevent attacks that have the most severe consequences.
- (27%) The DHS should budget to prevent attacks that are most likely to occur.
- (55%) The DHS should budget to prevent attacks based on a balance of the likelihood of attack and their consequences.
- (1%) The DHS should budget to prevent attacks that the public would be most likely to blame the DHS for if they occurred.
- (0%) The DHS should budget to prevent attacks that the public would find most upsetting.

A majority selected a normative approach that balanced likelihoods and consequences. The next highest percentage indicated that the DHS should stop attacks that are most likely to occur. To examine people's preference when likelihoods were pitted directly against consequences, we asked a separate group of undergraduates which of two strategies the DHS should use to use when making anti-terror policy decisions ($N=38$):

- (32%) The DHS should budget to prevent attacks that have the most severe consequences.
- (68%) The DHS should budget to prevent attacks that are most likely to occur.

Respondents were more than twice as likely to advocate the use of likelihoods rather than consequences when the DHS makes budget decisions. As we discuss and investigate below, the public's anti-terror preferences and judgments about the blameworthiness of government failures to stop terrorist attacks do not reflect the public's prescriptions.

Probability neglect, blame, and anti-terror policy

A substantial literature documents how people's economic preferences are influenced by affective considerations (Kahneman, Schkade, & Ritov, 1999). In particular, people use their feelings to make risk judgments, which contributes to probability neglect (Loewenstein, Weber, Hsee, & Welch, 2001). The public tends to underweight likelihood information in judgments and choices when faced with emotionally arousing events, particularly events that are dreaded or vivid (Slovic, Finucane, Peters, & MacGregor, 2002). Changes in probabilities, for instance, have little influence on emotional reactions to a variety of events from receiving electric shocks (Bankhart & Elliot, 1974; Monat, Averill, & Lazarus, 1972; Snortum & Wilding, 1971) to winning lotteries (Loewenstein et al., 2001). Moreover, increasing the emotional salience of an event can reduce the influence of likelihoods on choice decisions (Rottenstreich & Hsee, 1999; but see McGraw, Shafir, & Todorov, 2008). For instance, people are willing to pay more for flight insurance that compensates for losses due to terrorism than they are for flight insurance that compensates for losses due to any reason -- even though the likelihood of the former is lower than the likelihood of the latter (Johnson, Hershey, Meszaros, & Kunreuther, 1993).

People also have particular difficulty dealing with probabilistic information for small likelihood events. They have a hard time gauging how concerned to feel about a 1 in 100,000 likelihood of death without a context to evaluate the likelihood, and thus, people do not know whether the risk is large or small. People could not distinguish the relative safety of a chemical plant that had an annual chance of experiencing a catastrophic accident that varied from 1 in 10,000 to 1 in 1 million (Kunreuther, Novemsky & Kahneman, 2001).

Of particular relevance to our inquiry is a paper by Sunstein (2003) that documents how the fear of terrorism leads people to neglect likelihoods. As a result the public appears more concerned about highly unlikely terrorist acts than common yet mundane risks like traffic or consumer safety. Ironically, probability neglect puts the public in greater jeopardy because the government moves resources away from addressing public safety issues to prevent terrorist attacks even though those decisions cannot be justified by normative considerations (i.e., weighting potential consequences by their likelihood of occurrence). Mueller (2006), similarly, highlights how terrorism creates fear that is not commensurate with likelihoods or potential consequences, thus creating policy-related costs and opportunity costs for the public.

We contend that people often fail to take into account the likelihood of a terrorist attack when judging the blameworthiness of officials for failing to prevent the attack. Theories of blame and responsibility posit that emotional reactions, whether directly or indirectly related to an act, mediate blame (Alicke, 2000). People ascribe more blame in situations when the blameworthy outcome elicits greater negative emotions. The relationship between emotions and blame is well-documented for juror decision making (Feigenson & Park, 2006). For instance, gruesome photographs presented by the prosecution to mock jurors caused greater emotional arousal, in particular directing anger toward the defendant, which increased judged culpability (Bright & Goodman-Delahunty, 2006). Similarly, we hypothesize that gruesome or upsetting terrorist acts may cause greater negative emotions and, consequently, increase blame for perceived government failures to prevent the act.

We suspect that salient, upsetting terrorist attacks, like 9/11, will garner greater blame than less upsetting attacks because the public expects the government to address terrorist threats that are well publicized. A terrorist event like 9/11 is easily imagined (Tversky & Kahneman,

1974), and the public's judgments of blame for failing to prevent an attack may be made by judging how upsetting another similar attack is rather than by its chance of reoccurrence (Kahneman & Frederick, 2002). Put another way, people may substitute answering a hard question (How responsible should the government be for failing to stop the attack?) with an easier question (How upset would I be if the attack occurred?). Thus, we expect that the repetition of an upsetting terrorist attack, even if judged to be less likely than another attack, will be associated with greater blame. Similarly, we suspect that the public's view of anti-terror priorities before an attack will be more strongly associated with judgments of blame than with estimates of the likelihood of such attacks. Emotional reactions are more salient than likelihoods when judging how important it is to stop terrorist attacks.

Policy maker responses to the public's probability neglect

If the public's anti-terror preferences and tendency to blame the government neglects likelihood information, policy makers may be tempted to forgo a normative approach to risk in order to avoid blame. As we will discuss, policy makers are influenced by their accountability to the public. Alternatively, policy makers could take a normative approach to anti-terror policy, and when necessary, inform the public of likelihoods using appropriate risk communication techniques (Sunstein, 2003; Fischhoff, in press; Slovic, 2000).

People often can be persuaded to attend to likelihood information (Margolis, 1993). For instance, while consumers do not think about the likelihood of product malfunctions when deciding to purchase warranties, they will use that information if it is presented to them explicitly at the time (Hogarth & Kunreuther, 1995). Thus, after a terrorist attack has occurred, policy

makers could highlight the improbability of the attack in order to reduce blame on the government (Markman & Tetlock, 2000; K.M. McGraw, 1991, 2001). As an example, consider statements by the Bush administration after the 9/11 attacks that allude to their unlikelyhood:

“No one could have conceivably imagined suicide bombers burrowing into our society and then emerging all in the same day to fly their aircraft - fly U.S. aircraft into buildings.” - President George W. Bush (9/16/01)

“I don't think anybody could have predicted that ... they would try to use an airplane as a missile, a hijacked airplane as a missile.” - National Security Adviser Condoleezza Rice (5/16/02)

While we suspect providing likelihood information will be effective in influencing anti-terror preferences before a terrorist attack, we doubt that highlighting likelihoods will affect blame after an attack because of the robust effect outcomes have on judgments. The blameworthiness of an outcome is more strongly associated with its severity than prior actions (Robbennolt, 2000; Alicke, 2000). For instance, in the now classic study by Walster (1966), judgments of blameworthiness of a driver were greater when the outcome of an accident was more severe, even when the identical actions led to the accident -- an outcome bias that persists even in the face of within-subject manipulations of outcome (Mazzocco, Alicke, & Davis, 2004).

In a similar vein, the hindsight bias illustrates how perceptions of likelihoods often change after an event has occurred; people judge events that have occurred as more probable and events that have not occurred as less probable (Fischhoff, 1975). Indeed, probability judgments of terror-related risks appear susceptible to a hindsight bias. After a year without incident, people recalled their predicted likelihoods of terrorism to be more in line with a present, safer world (Fischhoff, Gonzelez, Lerner, & Small, 2005).

The robust nature of outcome biases creates a paradox for policy makers. Even if the public agrees that likelihood information should be used to make decisions, after an attack policy

makers will be blamed based on how upsetting the attack is and not based on the attack's prior (un)likelihood. If this is true, policy makers may be tempted to deviate from a normative risk-based approach in order to prevent blame. We return to this dilemma in the general discussion.

Study 1

The objective of our first study was to demonstrate that judgments of blame for failing to prevent terrorist attacks can be independent of judgments about the likelihoods of these attacks. Consider how the public might blame the U.S. government for failing to stop another terrorist attack like 9/11. We expect that government failures to prevent events resembling prior terrorist attacks, which are highly accessible in people's memory and highly upsetting but relatively unlikely, would evoke stronger blame responses than failing to prevent more likely, less upsetting, and seemingly more novel terrorist events.

We asked people how much they would blame the government for failing to prevent various terrorist attacks and then, in an ostensibly unrelated study, they were asked to assess how likely these attacks were. Two of the attacks involved a hijacked airplane and resembled the 9/11 terrorist attack on the World Trade Center in NYC. Two other attacks either involved a truck loaded with explosives or a rocket launcher. Although the types of attack – using an airplane or a truck loaded with explosives – were described as achieving the same results, we expected that the attack involving an airplane would elicit stronger blame responses than the attack involving a truck loaded with explosives despite the fact that the latter would be perceived as more likely to occur.

In a pilot test, we examined if a 9/11 style attack would be more upsetting than a truck bomb attack or a rocket launcher attack. Undergraduate students were shown twenty descriptions of various terrorist attacks and asked to judge how upset they would be if each attack occurred ($N=41$; see Appendix 1). Our hypothesis was confirmed. Flying a commercial jet into a civilian object was judged the second most upsetting attack after the detonation of a nuclear device in a metropolitan area. A rocket launched attack and a truck bomb attack were ranked tenth and twelfth, respectively, out of the twenty attacks.

Method

Participants. One-hundred and eleven undergraduate students at Princeton University participated in the study for a fixed payment that had no relationship to their responses.

Procedures. Participants took part in a one-hour long session involving numerous unrelated questionnaires. The two questionnaires of interest for the current study were placed at the beginning and end of the session.

The first questionnaire was presented as a study about potential terrorist actions and the responsibility of the government. Participants were asked how much they would blame the government for failing to prevent 6 potential terrorist actions using a seven-point scale, ranging from 0 (not at all) to 6 (very much). The six questions always referred to six civilian objects (2 high-rise buildings, 2 bridges, and 2 train stations): Empire State Building in NYC, Sears Tower in Chicago, Brooklyn Bridge in NYC, Golden Gate Bridge in San Francisco, Grand Central Station in NYC, and Union Station in Washington, DC. The questionnaire described three types of attacks: hijacking an airplane, loading a truck with explosives, and using a rocket launcher.

These two features – type of civilian object and means of attack – were manipulated within-subjects. To make the objectives of the study less transparent and reduce demand characteristics, the combinations of means of attack and type of object were counterbalanced across participants. For example, one group of participants responded how much they would blame the government for failing to prevent striking the two high-rise buildings with a hijacked airplane, the two bridges with a truck loaded with explosives, and the two train stations with a rocket launcher. Participants were randomly assigned to one of the three sets.

In addition, half of the participants were told that the attacks would kill about 50 people and for the other half that the attacks would kill about 300 people. This between-subjects manipulation of the number of victims did not have any effects on judgments. Thus, for ease of presentation, we ignored this factor in our presentation of the results.¹

The second related questionnaire that participants were given was placed at the very end of the one-hour questionnaire session. Participants were asked to rate the likelihood of different attacks from the perspective of a terrorist organization. The instructions read as follows:

The federal government created the Department of Homeland Security to prevent terrorist attacks on the US. In fact, there are very serious concerns that terrorist organizations will attempt such attacks on American soil. Taking the perspective of a terrorist organization, please rate how likely it is that the organization will attempt the actions described below.

Responses were made on an eleven-point scale, ranging from 0 (not at all likely) to 10 (extremely likely). Participants were asked to respond to all 18 combinations of means of attack and type of civilian object (3 X 6).

¹ Insensitivity to scope information replicates other decision-making studies (Hsee & Rottenstreich, 2004; Kahneman, Ritov, & Schkade, 1999), which suggests that participants' judgments were guided by their emotional responses to the potential attacks without regard to the number of people affected by it.

Results and discussion

Participants blamed the government more if terrorists used a hijacked airplane ($M = 3.50$, $SD = 1.60$) than if they used a truck loaded with explosives ($M = 2.90$, $SD = 1.73$), $t(110) = 4.59$, Cohen's $d = 0.36$, or a rocket launcher ($M = 3.04$, $SD = 1.61$), $t(110) = 4.00$, $d = 0.29$. This effect is demonstrated graphically in Figure 1a.²

For each potential target of attack, participants thought that terrorists would be more likely to use a truck loaded with explosives than a hijacked airplane or a rocket launcher (See Fig. 1b). This finding was confirmed by a 3 (means of attack) X 6 (type of object) repeated measures ANOVA³. The only significant effect was the type of attack, $F(2, 218) = 21.14$. Participants thought that terrorists were more likely to use a truck loaded with explosives ($M = 4.70$, $SD = 2.14$) than a hijacked airplane ($M = 3.69$, $SD = 2.40$), $t(110) = 5.05$, $d = 0.44$, or a rocket launcher ($M = 3.35$, $SD = 2.11$), $t(110) = 6.47$, $d = 0.64$.

We also explored the relationship between blame and likelihood judgments. As shown in Table 1, blame and likelihood judgments were practically uncorrelated (r 's = .06 - .09). The findings suggest that judgments of likelihoods of terrorist attacks and judgments of blame of the government for failing to prevent the attacks can be dissociated. That is, attacks that are perceived as more likely can simultaneously be perceived as less blameworthy. In the current study, respondents thought that terrorists would be more likely to strike a civilian object with a truck loaded with explosives than a hijacked airplane. At the same time, they were more willing to blame the government for failing to prevent the latter than the former attack.

² Statistical tests are significant at $p < .05$ unless otherwise noted.

³ Notice that this analysis could not be conducted on the analysis of blame judgments because of the counterbalancing schema. However, as can be seen from Fig. 1, for every potential target of attack, the direction of the difference between judgments involving an airplane attack and those involving a truck was the same.

Study 2

The findings of Study 1 suggest that two sets of considerations – likelihood and blame judgments – are largely independent. In our next study, we examined if blame is associated with emotional reactions, which would be consistent with previous literature, and whether blame would also be associated with anti-terror budget priorities.

Method

Participants. Seventy-seven undergraduate students at the University of Colorado, Boulder participated in the study for partial course credit.

Procedures. The questionnaire was administered as part of a session involving numerous unrelated questionnaires. Participants were shown a list of twelve potential terrorist attacks culled from the Department of Homeland Security's National Planning Scenarios (see Appendix 2). Participants were randomly assigned to one of four conditions: likelihood, blame, budget priority, or emotional reactions. Judgments were made on a seven-point scale. Participants in the likelihood condition were asked to rate on a scale anchored with "not at all" and "very likely" the relative likelihood of each event occurring within the next three years. Participants in the blame condition were asked to rate on a scale anchored with "not at all" and "very much" how much they would blame the government for failing to prevent the acts. Participants in the budget priority condition were asked to rate on a scale anchored with "very low" and "very high," how much the Department of Homeland Security should make preventing each of the acts a budget

priority. Participants in the emotional reaction condition were asked to rate on a scale anchored with “slightly upset” and “emotionally devastated” how upset they would be if the terrorist attack happened.

Results and discussion

We calculated the mean rating for each of the twelve terrorist attacks for each dependent variable condition. There were no outliers or influential data points in the data. We conducted correlational analyses to examine the relationship between conditions. Consistent with our prediction, we found that emotion ratings, blame judgments, and anti-terror budget preferences (for the DHS) were highly correlated and statistically significant (See Table 2). When emotion judgments are controlled for in a partial correlation between blame and budget judgments their relationship remains positive but drops from .66 to .40 ($p > .21$), which suggests that emotion judgments partially mediate the relationship between blame and budget judgments. As shown in Table 2 the correlations between those judgments and perceived likelihoods were small and not statistically significant.

Study 2 provides further evidence that people treat likelihoods as largely distinct from the blameworthiness of terrorist attacks. Likelihoods are similarly distinct from emotional reactions and anti-terror preferences. The study also shows strong association between blame judgments, emotional reactions to terrorist attacks, and anti-terror preferences.

Study 3

In Study 3, we tested if blame was a stronger determinant of simulated budget priority decisions than likelihoods in a sample of sophisticated decision analysts. We wanted to examine if a population that is familiar and supportive of normative methods would be susceptible to the same tendencies of the public when those normative methods are not readily available or salient.

Method

Participants. Three-hundred and twenty-three members of the Decision Analysis Society volunteered to participate in a web-based survey on terrorism. The entire survey was completed by 293 individuals (18.4% women) ranging in age from 22 to 89 with a mean age of 39 years. The sample was highly educated; 12.6% with bachelor degrees, 47.1% with master degrees, and 40.3% with doctoral degrees. Thirty-nine percent were employed in academic settings and 39% in industry settings.

Procedures. Participants were invited by email to participate in a study on terrorism. After responding to a series of demographic questions, they were randomly assigned to one of two conditions – a likelihood condition or a blame condition. In the blame condition, participants were asked to rate how much they would blame the government for failing to prevent each of 14 potential terrorist acts (See Appendix 3) using a seven-point scale ranging from 0 (Not at all) to 6 (Very high). In the likelihood condition, participants were asked to rate the relative likelihood of each event occurring within the next three years using an eleven-point scale ranging from 0 (Not at all) to 10 (Very likely).

After completing the likelihood or blame survey, all participants read that “The Federal Government created the Department of Homeland Security (DHS) to prevent terrorist attacks on

the US,” and were asked to rate how much budget priority the DHS should give to each of the 14 acts based on a six-point scale ranging from 1 (very low) to 5 (very high). The order of the 14 events was randomized for each set of judgments – likelihood, blame, and budget – and each participant.

Results

For each participant, we computed the correlation between their judgments of blame or likelihood and their judgments of budget priority. To conduct statistical tests, we transformed these correlations into Fisher z-scores.⁴ The average correlation between blame and budget judgments ($r = .63$) was significantly higher than the average correlation between likelihood and budget judgments ($r = .28$), $t(261) = 7.86$.⁵ The results were identical when the analysis was limited to a) experienced decision analysts with 10 or more years of experience after obtaining their degree (.69 vs. .22 for the blame and likelihood judgment correlations respectively), $t(102) = 6.23$, b) the most educated analysts with doctoral degrees (.68 vs. .28), $t(104) = 5.37$, and c) the most educated and experienced analysts with doctoral degrees and 10 or more years of experience (.73 vs. .20), $t(59) = 4.90$.

We also computed the correlations between blame, likelihood and budgetary judgments for the aggregated (i.e., mean) judgments for each of the fourteen acts. That is, act was the unit of analysis. The blame judgments correlated much more strongly with the budget priority judgments ($r = .89$) than likelihood judgments ($r = .10$). We regressed the mean budget judgments (averaged across both experimental conditions) on the likelihood and blame

⁴ We could not compute the correlations for 10% of participants in the sample because these participants provided the same judgments for one or both sets of judgments (i.e. there was no variance in their data).

⁵ We obtained the same results for a sample of undergraduate students.

judgments. Likelihoods and blame judgments accounted for 80.1% of the variance of the budget judgments. Although likelihood judgments were a significant predictor of budget judgments, $t(11) = 2.94$, blame judgments were a stronger predictor, $t(11) = 6.45$. In fact, blame judgments alone accounted for 64.4% of the variance in respondents budget judgments, whereas likelihood judgments alone accounted for a mere 4.8% of the variance.

In summary, Study 3 revealed similar findings to those of Study 2 using a sample of decision analysts. Anti-terror budget priorities were well-predicted by blame but not by perceived likelihoods. Although the people from this sample advocate and often make their living using normative methods, when those methods are not salient or readily available, the decision analysts' inclinations are similar to those of the public. The study highlights the need to understand the conditions under which likelihoods will and will not influence anti-terror policy decisions.

In the next study, we test whether likelihood information needs to be a salient consideration for it to be incorporated into budget priorities.

Study 4

Having found the relative lack of influence of likelihoods on blame and budget decisions, our final study examined if people can be persuaded to use likelihood information in their budget and blame judgments. If people can successfully be persuaded, policy makers could respond to blame by the public by highlighting the likelihood of attack.

In the study, people made budget prioritizations or blame assessments either with or without likelihood information present. We expected that people making budgetary judgments

with salient likelihood information would incorporate likelihoods into their judgments, as might be expected from a normative treatment of risk. However, we expected, consistent with outcome biases, that people making blame judgments would not be influenced by likelihoods, whether or not the likelihoods of attack were salient.

Method

Participants. One-hundred and sixteen undergraduate students at the University of Colorado, Boulder participated for partial course credit.

Procedures. Participants were randomly assigned to one of four conditions that were part of a 2 (judgment: budget or blame) x 2 (likelihoods: presented or not) design. In all conditions, participants responded to questions about 10 terrorist acts based on scenarios used by the Department of Homeland Security (See Appendix 4).

Participants in the budget condition were asked to rate from 1 (very low) to 5 (very high) how much of a budget priority the DHS should make preventing each of the 10 terrorist acts. Participants in the blame condition were asked to rate from 1 (not at all) to 6 (very much) how much they would blame the government for failing to prevent the acts. In the likelihood information condition, participants were told that each scenario included a rating of the relative likelihood of the event occurring in the next three years, from 0 (not likely) to 10 (very likely), as judged by a group of risk experts. Likelihoods were actually based on mean judgments by a separate group of students culled from the same population ($N=20$).

Results and discussion

We began by examining if we replicate effects from previous studies, particularly Study 3, in which likelihoods would not strongly influence blame and budget judgments. We looked at the average ratings for each of the ten attacks with the likelihood judgments. The terrorist attacks served as the unit of analysis and were correlated with the likelihood information. Table 3 presents our results. The correlations when likelihood information was not present were low and not unlike the effects we have shown previously. We use these correlations as a baseline measure to compare the effect of explicit, salient likelihood information on judgments.

When we provided likelihood information, this correlation increased substantially ($r=.84$; $z = 3.51$; See Table 3). In contrast to budget judgments, prior likelihood information did not have a statistical effect on blame judgments. The correlation between aggregate blame judgments and the likelihood information was non-significant and did not depend on whether likelihood information was presented or not ($r=.24$ and $r=.36$, respectively; $z = 0.5$). An analysis of individual correlations of each respondent's judgments with the likelihood information reaches the same conclusion.⁶

Consistent with a robust outcome bias, we were unable to persuade respondents to increase the reliance on likelihood information when judging how much they would blame the government for failing to prevent terrorist attacks. Responses were not statistically different from a group who were not provided likelihood information. However, it is not the case that likelihood

⁶ The same conclusions can be drawn when the analysis is conducted at the individual subject level. When likelihood information was present there was a significant increase in the correlation between likelihoods and budget priorities ($r_{\text{no likelihood}} = .19$ to $r_{\text{likelihood}} = .49$; $t(58)=4.5$). However, there was no change in the correlations in the blame condition ($r_{\text{no likelihood}} = .15$ to $r_{\text{likelihood}} = .11$; the interaction of judgment and likelihood information was significant: $F(1, 112)=7.3$).

information is always ignored. When likelihood information was presented, respondents incorporated that information into their anti-terror budget allocations.

General Discussion

The tendency for the public to deviate from rational or normative consideration is well documented (Caplan, 2007; Kahneman, Slovic, & Tversky, 1982). We contend that the public's risk reactions to potential terrorist attacks also deviate from a normative treatment of risk by failing to weight consequences by the likelihood of the event (Sunstein, 2003). We find that blame is largely independent of perceived likelihoods. One determinant of blame is whether a terrorist attack is highly upsetting and salient regardless of its likelihood (Study 1). Blame judgments and anti-terror policy preferences are strongly associated with the negative emotions that people have in response to terrorist attacks, whereas likelihoods of attack are substantially if not totally discounted (Study 2). Anti-terror budget priorities, similarly, are less likely to be related to likelihood information than to the blame that the government would experience for failing to prevent the acts, a result that holds even for decision analysts (Study 3).

Accountability of policy makers to the public

There is anecdotal evidence that a purely risk-focused approach may not be the only input to anti-terror policy decisions. Political pork projects may find their way into anti-terror spending. For instance, political leaders in New York bitterly complained that the DHS failed to provide grant money that was commensurate with the terror risks facing New York City, as the

city has been targeted before and will likely be targeted again (Hernandez, 2004). Politicians were especially upset about a government allocation policy in which cities such as Louisville, KY and Fresno, CA are able to apply for “high-threat” grant money because they do not face significant threats of terrorism (Chen, 2007).

We are concerned that policy and spending related to anti-terror security measures could also be motivated by the anticipated reactions and preferences of the public. Although another 9/11 style attack is highly unlikely (see Mueller, 2006), Study 1 suggests that the public’s reactions to another attack would be politically uncomfortable if not devastating. This may explain why the U.S. government focuses substantial resources on reducing terrorist risks to the airline industry; fourteen percent of the Homeland Security’s \$46 billion 2008 budget is dedicated to the Transportation Security Administration (TSA).

Democratic systems of government demand that elected and appointed officials are responsible to citizens for their actions, and accountability can encourage or deter normative thought (Lerner & Tetlock 1999). When constituents’ reactions to the outcomes of decisions are predictable, one desirable strategy is to conduct a thorough analysis of options and future-oriented rationality in order to minimize negative outcomes and resulting negative evaluations (Tetlock, 1992). Another response to accountability is to strategically shift attitudes and behavior to please the public (Adelberg & Batson, 1978; Tetlock, Skitka, & Boettger, 1989). The latter strategy is more common when the outcomes of the decision rather than the decision process are the basis for the evaluation (Simonson & Staw, 1992), as is likely to be the case with terrorist attacks. In the present discussion, strategic shifts toward the public’s preference can have the undesirable effect of making the public less safe because attacks that are less likely but more blameworthy could receive greater resources.

Despite their experience and stature, politicians are not immune to accountability effects. The tendency of the public to blame politicians is well-documented (Iyengar, 1991; Sniderman, Hagen, & Tetlock, 1986; Thompson, 1980) and accountability to the public and blame avoidance influence voting decisions (Arnold, 1990; Kingdon, 1981; Weaver, 1986, 1988). Pressure from the public influences more than just votes. For instance, negative public opinion quickly led the government to shut down the Pentagon's plan for a futures market in which traders could bet on where and when terrorist attacks would occur (Guggenheim, 2003; Lantham, 2003; Sunstein, 2003).

If we are correct, policy makers face a delicate balancing act between keeping the public safe and keeping the public happy. As we have discussed, policy makers could maintain a normative risk focus and educate the public about the prior likelihoods of attack in the face of backlash for anti-terror failures. However, we show a weakness with that solution. Although people can be persuaded to use likelihood information for anti-terror budget priorities, people cannot be similarly persuaded to take into account likelihoods when judging blame in light of terrorist acts that have occurred (Study 4).

Thus, policy makers appear to be stuck between a rock and hard place. In order to minimize risk to the public, the policy maker must risk angering the public in order to keep them safer than they otherwise would prefer. The policy maker who uses normative methods to stop harm from happening rarely is recognized for successful preventive measures (Taleb, 2007). Only when some unfortunate event does happen is the policy maker scrutinized for decisions that were made in the best interest of the public, but nonetheless made prior to a successful attack. Taking these issues into account, the government could consider novel solutions to the dilemma. For example, the government could be make appointments to the DHS similar to that of judges

with lifelong or fixed appointments, so that policy makers can serve without risk of political pressure.

Limitations, alternative explanations, and future directions

We raise the concern that policy makers face multiple influences when designing anti-terror policy, one being the emotional reactions of the public. A limitation of our conjecture is that we do not survey policy makers or analyze their actual anti-terror decisions. Given the well-developed literature that documents how accountability of the public can influence policy makers, we believe it is reasonable to point out the dilemma created by considerations of blame. Moreover, anecdotal evidence already suggests that anti-terror decisions are being influenced by more than normative considerations.

We show that our expert sample of decision analysts act similarly to the non-experts we sample, exhibiting probability neglect in budgetary judgments, which are in turn well-predicted by blame. This result does not necessarily lead to the conclusion that government policy makers will act as the public or our sample of decision analysts does (Rachlinski, 2000). After all, even if policy makers are inclined to rely on their feelings, they have normative techniques of risk analysis at their disposal to avoid undue effects of their own emotional processes. Thus, the finding we present is important because it highlights the need for likelihood information to be explicitly considered in the design of policy.

In some of our studies the number of category scale points differed between measures of blame, budget, and likelihoods. At first blush, this could raise the question of our results. However, concerns about differences in category scales cannot explain the consistent pattern of

probability neglect across our studies. In particular, the pattern we found in Study 2 shows our proposed effects using a seven-point scale for judgments of emotion, budget, blame, and likelihood. Another concern that could be raised is that the likelihood scale is not reliable, which could inhibit the detection of an effect of perceived likelihoods in our studies.⁷ We highlight two findings that show the reliability of the likelihood measure that assuage that concern. In Study 1, we show a significant effect of likelihood judgments as a function of the type of attack, which indicates the measure is sensitive enough to detect likelihood differences in various attacks. Also, in Study 4, we show that likelihood judgments that we present to our respondents differentially influence budget and blame judgments.

Finally, in our studies we limited the measurement of emotional reactions to how upset respondents would be about potential terrorist acts. It is not clear the degree to which our question tapped into specific emotions of sadness and anger; for example. Small, Lerner, and Fischhoff (2006) examined attributions of the public about the causes of the 9/11 terrorist attacks. Causal attributions of terrorist or government actions were greater for people angry about the attacks than those people saddened by the attacks. While we ascribe the neglect of probability in our studies to people's reliance on their emotions, we do not know the degree to which this effect is due to specific emotions like fear, sadness, or anger. While we suspect that blame judgments were due to anger, which would be consistent with Small et al. (2006), we leave this question to future research.

Conclusion

⁷ We thank Uri Simonsohn for raising this point.

We document people's tendency to ignore information about the likelihood of terrorist attacks when assessing blame on policy makers. Moreover, even if the policy makers are able to cite the likelihoods of attack in order to satisfy the public regarding anti-terror allocations, once an attack happens, the use of a priori risk information will cease to be an effective justification. Thus, the psychological nature of people's perceptions and processing of risk information may have a perverse policy effect on their safety. The public's tendency to evaluate anti-terror activities on the outcome and not on the quality of policy makers' decisions creates incentives for policy makers to deviate from a purely risk-based approach. Given this behavior we urge a dialogue with policy makers that enables them to explore ways that they can effectively make decisions that are not in their best interest but in the best interests of their constituents.

References

- Adelberg, S., & Batson, D.C. (1978). Accountability and helping: When needs exceed resources. *Journal of Personality and Social Psychology*, 36(4), 343-350.
- Alicke, M.D. (2000). Culpable control and the psychology of blame. *Psychological Bulletin*, 126, 556-574.
- Arnold, R.D. (1990). *The logic of congressional action*. New Haven, CT: Yale University Press.
- Bankhart, C.P., & Elliot, R., (1974). Heart rate and skin conductance in anticipation of shocks, with varying probability of occurrence. *Psychophysiology*, 11, 160-174.
- Bier, B. (2006). Game-theoretic and reliability methods in counter-terrorism and security. In A.G. Wilson, G.D. Wilson, and D.H. Olwell (Eds.), *Statistical methods in counter-terrorism: game theory, modeling, syndromic surveillance, and biometric authentication*. New York, NY: Springer .
- Bright, D.A., & Goodman-Delahunty, J. (2006). Gruesome evidence and emotion: Anger, blame, and jury decision-making. *Law and Human Behavior*, 30, 183-202.
- Caplan, B. (2007). *The myth of the rational voter*. Princeton, NJ: Princeton University Press.
- Chen, S. (2007, January 9). Bloomberg criticizes security fund distribution. *The New York Times*, p. B.5).
- Edwards, W., Newman, J.R., Snapper, K., & Seaver, D. (1982). *Multiattribute evaluation*. Beverly Hills, CA: Sage Publications.
- Feigenson, N., & Park, J. (2006). Emotions and attributions of legal responsibility and blame: A research review. *Law and Human Behavior*, 30, 143-161.

- Fischhoff, B. (1975). Hindsight \neq foresight: The effects of outcome knowledge on judgment under uncertainty. *Journal of Experimental Psychology: Human Perception and Performance*, 1, 288-299.
- Fischhoff, B. (in press). Risk perception and communication. In R. Detels, R. Beaglehole, M.A. Lansang, and M. Gulliford (Eds.), *Oxford Textbook of Public Health, Fifth Edition* (Chapter 8.9). Oxford: Oxford University Press.
- Guggenheim, K. (2003, July 29). Pentagon says threat-bet program to be canceled. *Associated Press*.
- Hernandez, R. (2004, January 27). New York seeks change in disbursing terror funds. *The New York Times*, p. B.5.
- Hogarth & Kunreuther (1995). Decision making under ignorance: Arguing with yourself. *Journal of Risk and Uncertainty*, 10, 15-36.
- Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago, IL: University of Chicago Press.
- Johnson, E. J., Hershey, J., Meszaros, J., & Kunreuther, H. (1993). Framing, probability distortions, and insurance decisions. *Journal of Risk and Uncertainty*, 7, 35 - 51.
- Kahneman, D., & Frederick, S. (2004). Attribute substitution in intuitive judgment. In M. Augier & J. G. March (Eds.), *Models of a man: Essays in memory of Herbert A. Simon* (pp. 411-432). Cambridge, MA: MIT Press.
- Kahneman, D., Ritov, I., & Schkade, D. (1999). Economic preference or attitude expressions? An analysis of dollar response to public issues. *Journal of Risk and Uncertainty*, 19, 203-235.

- Kahneman, D., Slovic, P., & Tversky, A. (1982). *Judgment and Uncertainty: Heuristics and Biases*. New York, NY: Cambridge University Press.
- Keeny, R. L. (1977). The art of assessing multiattribute utility functions. *Organizational Behavior and Human Performance*, 19, 267-310.
- Keeney, R. L. (1988). Value-focused thinking and the study of values. In David E. Bell, Howard Raiffa, and Amos Tversky (Eds.), *Decision making: Descriptive, normative, and prescriptive interactions*. New York, NY: Cambridge University Press.
- Keohane, N. & Zeckhauser, R. (2003). The ecology of terror defense. *Journal of Risk and Uncertainty*, 26, 231–249.
- Kingdon, J.W. (1981). *Congressman's voting decisions* (2nd ed.). New York: Haper and Row.
- Kunreuther, H., Novemsky, N., & Kahneman, D. (2001), Making Low Probabilities Useful. *Journal of Risk and Uncertainty*, 23, 103-120.
- Lathem, N. (2003, July 30). Pentagon de-lists its terror market. *New York Post*.
- Lerner, J. & Tetlock, P.E. (1999). Accounting for the effects of accountability. *Psychological Bulletin*, 125, 255-275.
- Loewenstein, G., Weber, E., Hsee, C. & Welch, N. (2001). Risk as Feelings. *Psychological Bulletin*. 127, 267–286.
- Margolis, H. (1993). *Dealing with risks*. Chicago: University of Chicago Press.
- Markman, K. D. & Tetlock, P.E. (2000). 'I couldn't have known': Accountability, foreseeability and counterfactual denials of responsibility. *British Journal of Social Psychology*, 39(3), 313-325.
- Mazzocco, P. J., Alicke, M. D., & Davis, T. L. (2004). On the robustness of outcome bias: No constraint by prior culpability. *Basic and Applied Social Psychology*, 2, 131-146.

- McGraw, A.P., Shafir, E., & Todorov, A. (2009). Valuing money and things: Why a \$20 item can be worth more and less than \$20. Manuscript under review. University of Colorado, Boulder.
- McGraw, K. M. (1991). Managing blame: An experimental test of the effects of political accounts. *American Political Science Review*, 85, 1133-1158.
- McGraw, K.M. (2001). Political accounts and attribution processes. In J. Kuklinski (Ed.), *Citizens and Politics: Perspectives from Political Psychology*. Cambridge University Press.
- Monat, A., Averill, J.R., & Lazarus, R.S. (1972). Anticipatory stress and coping reactions under various conditions of uncertainty. *Journal of Personality and Social Psychology*, 24, 237-253.
- Mueller, J. (2006). *Overblown: How politicians and the terrorism industry inflate national security threats, and why we believe them*. New York, NY: Free Press.
- Rachlinski, J.J. (2000). Heuristics, biases, and governance. In Derek J. Koehler & Nigel Harvey (Eds.), *The blackwell handbook of judgment and decision making* (pp. 567-584). Blackwell Publishing.
- Robbennolt, J. (2000). Outcome severity and judgments of “responsibility”. *A meta-analytic review*, 30, 2575-2609.
- Rottenstreich, Y. & Hsee, C. K. (2001). Money, kisses, and electric shocks: An affective psychology of risk. *Psychological Science*, 12, 185-190.
- Sandler, T., & Arce, D.G. (2003). Terrorism and game theory. *Simulation and Gaming*, 34, 319-337.

- Sandler, T., & Lapan, H.E. (1988). The calculus of dissent: An analysis of terrorists' choice of targets. *Syntheses*, 76, 245-261.
- Simonson, I., & Staw, B. M. (1992). Deescalation strategies: A comparison of techniques for reducing commitment to losing courses of action. *Journal of Applied Psychology*, 77, 419-426.
- Slovic, P. (2000). Informing and educating the public about risk. In P. Slovic (Ed.), *The Perceptions of risk*. (pp. 182-198). London: Earthscan Publications.
- Slovic, P., Finucane, M., Peters, E., & MacGregor, D. (2002). The affect heuristic. In T. Gilovich, D. Griffin & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 397-420). New York, NY: Cambridge University Press.
- Small, D. A., Lerner, J. S., & Fischhoff, B. (2006). Emotion priming and spontaneous attributions for terrorism: Americans' reactions in a national field experiment. *Political Psychology*, 27, 289-298.
- Sniderman, P.M., Hagen, M.G., & Tetlock, P.E. (1986). Reasoning chains: Causal models of policy reasoning in mass publics. *British Journal of Political Science*, 16, 405-430.
- Snortum, J.R., & Wilding, F.W. (1971). Temporal estimations of heart rate as a function of repression-sensitization score and probability of shock. *Journal of Consulting and Clinical Psychology*, 37, 417-422.
- Sunstein, C. R. (2003). Terrorism and probability neglect. *Journal of Risk and Uncertainty*, 26, 121-136.
- Taleb, N. (2007). *The Black Swan: The Impact of the Highly Improbable*. New York, NY: Random House.

- Tetlock, P. E. (1992). The impact of accountability on judgment and choice: Toward a social contingency model. In M. Zanna (Ed.), *Advances in experimental social psychology* (vol. 25) (pp. 331-376). New York, NY: Academic Press.
- Tetlock, P. E., Skitka, L., & Boettger, R. (1989). Social and cognitive strategies of coping with accountability: Conformity, complexity, and bolstering. *Journal of Personality and Social Psychology*, 57, 632-641.
- Thompson, D.F. (1980). Moral responsibility of public officials: The problem of many hands. *American Political Science Review*, 74, 905-916.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124-1131.
- Walster, E. (1966). The assignment of responsibility for an accident. *Journal of Personality and Social Psychology*, 3, 73-79.
- Weaver, R.K. (1986). The politics of blame avoidance. *Journal of Public Policy*, 6, 371-398.
- Weaver, R.K. (1988). *Automatic government: The politics of indexation*. Washington, DC: The Brookings Institution.

Table 1. Correlations between judgments of blame for failing to prevent terrorist attacks and judgments of perceived likelihood of such attacks (Study 1).

	Assigned blame			Perceived likelihood		
	Airplane ^a	Truck ^b	Rocket ^c	Airplane	Truck	Rocket
<u>Assigned blame</u>						
Airplane	--	.66*	.72*	.06		
Truck		--	.70*		.09	
Rocket launcher			--			.06
<u>Likelihood</u>						
Airplane				--	.58*	.42*
Truck					--	.47*
Rocket launcher						--

* $p < .05$

^aThese events involved the use of a hijacked airplane to strike a civilian object.

^bThese events involved the use of a truck loaded with explosives to strike a civilian object.

^cThese events involved the use of a rocket launcher to strike a civilian object.

Table 2. Correlations between mean judgments of blame, budget priorities, emotional reactions, and perceived likelihoods for twelve terrorist acts in (Study 2).

	Blame	Budget	Emotion	Likelihood
Blame	--	.66*	.58*	.19
Budget		--	.83*	.15
Emotion			--	-.01
Likelihood				--

* $p < .05$

Table 3. Correlations of mean judgments of budget priorities and perceived blame of the ten terrorist attacks in Study 4 with likelihood depending on whether likelihood information was presented or not to respondents.

	No likelihood	Likelihood
Budget	.25	.84*
Blame	.24	.36

* $p < .05$

Figure 1. A) Blame assigned to the government for failing to prevent terrorist attacks as a function of the means of attack and the civilian target of attack (Study 1). B) Perceived likelihood of terrorist attacks as a function of the means of attack and the civilian target of attack (Study 1). Error bars show standard errors.

Figure 1a

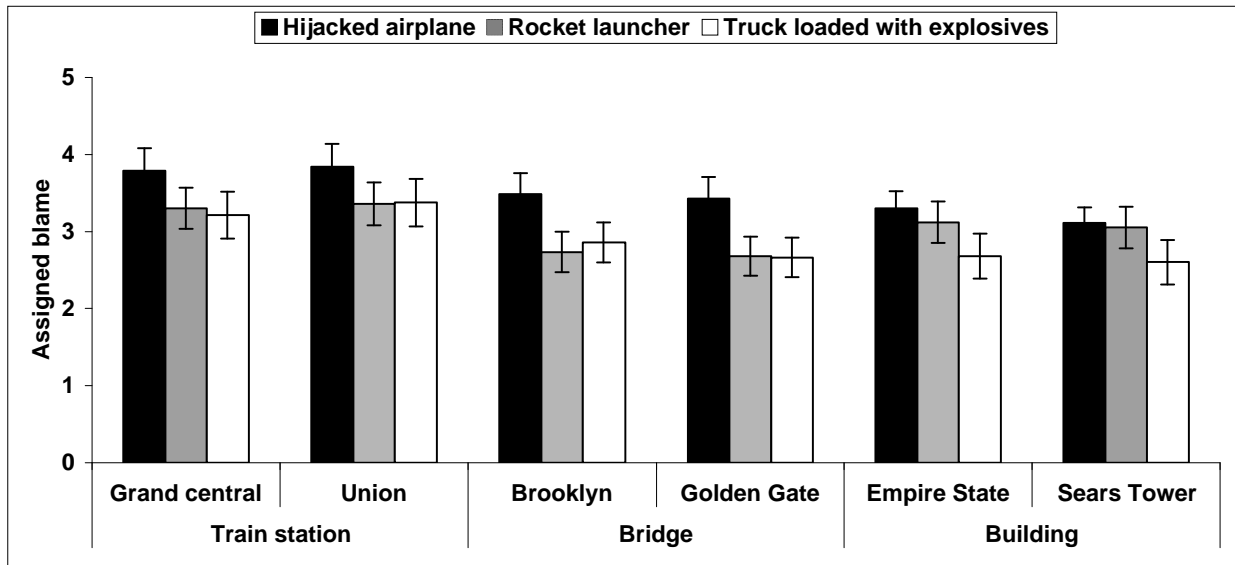
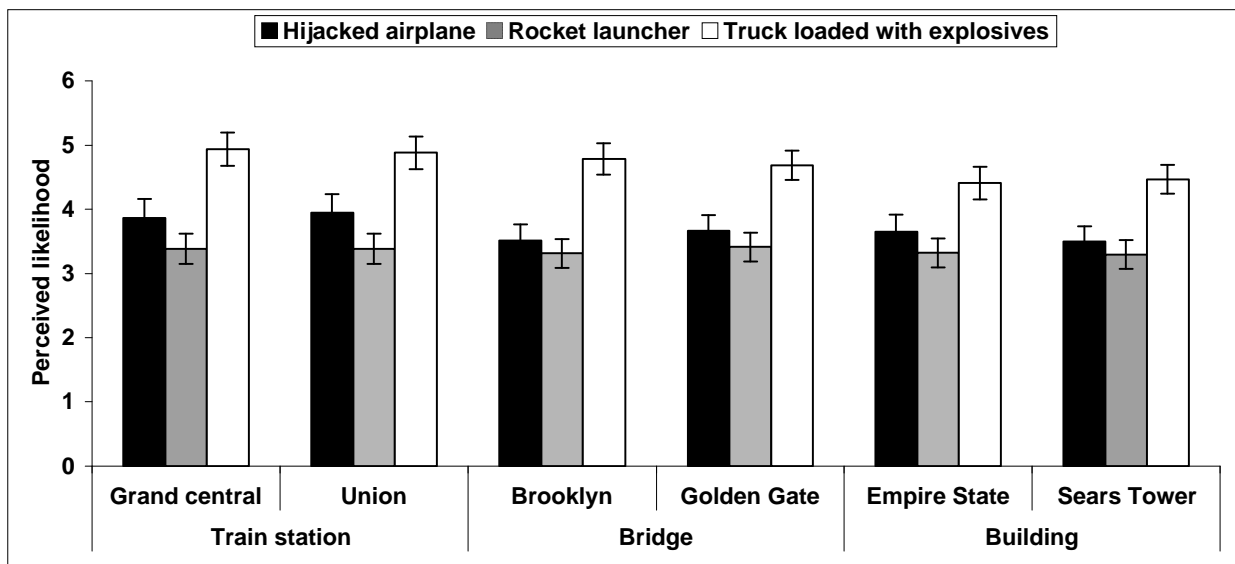


Figure 1b



Appendix 1. List of 20 potential terrorist attacks used in the manipulation check in Study 1.

- A dirty bomb is detonated and releases toxic agents in the air.
- The water supply in a community is contaminated with toxic agents.
- A biological agent (e.g., anthrax) is released on a community from a crop duster.
- Biological agents (e.g., anthrax) are disseminated through the mail.
- A commercial jet is hijacked.
- A commercial jet is flown into a civilian object.
- A bomb is smuggled and detonated on a commercial jet.
- Terrorists take control of a nuclear power plant.
- A bomb is smuggled and detonated on a passenger train.
- A cruise ship is hijacked.
- A bomb is smuggled and detonated on a cruise ship.
- A suicide bomb is detonated in a public place.
- A truck bomb is detonated in a public place.
- A rocket launcher is used to attack a public place.
- A city's electric power distribution is attacked and destroyed.
- A cyber attack is conducted on private or public sector computer networks (e.g., financial service, utility industry control systems.)
- A shoulder-fired missile is used to shoot down an airliner.
- A chemical plant is sabotaged, releasing a cloud of poisonous gas.
- A small nuclear device is smuggled into the country and detonated in a major metropolitan area.
- A major food source (crop or livestock) is attacked with a biological agent.

Appendix 2. List of 12 potential terrorist attacks used in Study 2.

Terrorists release foot and mouth disease into large livestock operations. The disease would result in a huge loss of livestock resulting in hundreds of millions of dollars lost and would require months to recover.

Terrorists detonate a 10-Kiloton Improvised Nuclear Device in a large metropolitan area. The Detonation would result in: widespread casualties from blast and fallout; 450,000+ people displaced; contamination over 3,000 square miles; hundreds of billions of dollars lost and years to recover.

Terrorists deliver aerosol anthrax in a metropolitan area with a large commuter workforce. Such an attack would result in 13,000+ casualties with extensive subsequent contamination; billions of dollars are lost and recovery takes months.

Terrorists release pneumonic plague into main areas of a major metropolitan city. The plague would result in 2,500 fatalities and 7,000 injuries with an economic loss of millions and require weeks for recovery.

Terrorists use a light aircraft to spray chemical agent Yellow into a football stadium or like large, dense, public gathering. The agent would be expected to cause 150 fatalities and 70,000 hospitalizations, causing an economic loss of \$500 million and possible long-term health affects for people exposed.

Terrorists bomb refineries and chemical production plants causing a release of toxic clouds. The release is expected to result in 350 fatalities and 1,000 hospitalizations; up to 700,000 people evacuated and economic losses of billions with months required for recovery.

Terrorists release nerve gas into ventilation systems in large office buildings. The gas would result in 6,000 fatalities and 350 injuries with an economic impact of \$300 million and recovery taking 3 to 4 months.

Terrorists bomb an industrial facility that stores large quantities of chlorine gas. The release of gas would result in 17,500 fatalities, 10,000 severe injuries, 100,000 hospitalizations resulting in millions of dollars of economic loss and requiring weeks for recovery.

Terrorists detonate a radioactive “dirty-bomb” in three metro areas. The detonation would cause: 180 fatalities, 720 injuries and 20,000 contaminations, contamination of 108 city blocks costing billions of dollars and requiring months to years to recover.

Terrorists bomb multiple public sites using improvised explosive devices. The bombings would cause 100 fatalities and 450 hospitalizations resulting in a localized economic impact requiring weeks to months to recover.

Terrorists infect food with anthrax via production plants. The infected food would cause 300 fatalities and 400 hospitalizations, result in millions of dollars economic loss and require weeks to recover.

Terrorists attack computer networks in the nation's financial infrastructure. The attack would cause network damage and cause millions of dollars of economic loss and require weeks to recover.

Appendix 3. List of 14 potential terrorist attacks used in Study 3.

- A dirty bomb is detonated and releases toxic agents in the air.
- The water supply in a community is contaminated with toxic agents.
- A biological agent (e.g., anthrax) is released on a community from a crop duster.
- Biological agents (e.g., anthrax) are disseminated through the mail.
- A commercial jet is hijacked.
- A commercial jet is flown into a civilian object.
- A bomb is smuggled and detonated on a commercial jet.
- Terrorists take control of a nuclear power plant.
- A bomb is smuggled and detonated on a passenger train.
- A cruise ship is hijacked.
- A bomb is smuggled and detonated on a cruise ship.
- A suicide bomb is detonated in a public place.
- A truck bomb is detonated in a public place.
- A rocket launcher is used to attack a public place.

Appendix 4. List of 10 potential terrorist attacks used in Study 4. Likelihood information, which was presented between-subjects, is presented in bold.

Terrorists detonate a 10-Kiloton Improvised Nuclear Device in a large metropolitan area. The Detonation would result in: widespread casualties from blast and fallout; 450,000+ people displaced; contamination over 3,000 square miles; hundreds of billions of dollars lost and years to recover. **Relative likelihood = 4.7.**

Terrorists deliver aerosol anthrax in a metropolitan area with a large commuter workforce. Such an attack would result in 13,000+ casualties with extensive subsequent contamination; billions of dollars are lost and recovery takes months. **Relative likelihood = 5.3.**

Terrorists release pneumonic plague into main areas of a major metropolitan city. The plague would result in 2,500 fatalities and 7,000 injuries with an economic loss of millions and require weeks for recovery. **Relative likelihood = 3.6.**

Terrorists use a light aircraft to spray chemical agent Yellow into a football stadium or like large, dense, public gathering. The agent would be expected to cause 150 fatalities and 70,000 hospitalizations, causing an economic loss of \$500 million and possible long-term health affects for people exposed. **Relative likelihood = 3.3.**

Terrorists bomb refineries and chemical production plants causing a release of toxic clouds. The release is expected to result in 350 fatalities and 1,000 hospitalizations; up to 700,000 people evacuated and economic losses of billions with months required for recovery. **Relative likelihood = 5.0.**

Terrorists release nerve gas into ventilation systems in large office buildings. The gas would result in 6,000 fatalities and 350 injuries with an economic impact of \$300 million and recovery taking 3 to 4 months. **Relative likelihood = 4.2.**

Terrorists bomb an industrial facility that stores large quantities of chlorine gas. The release of gas would result in 17,500 fatalities, 10,000 severe injuries, 100,000 hospitalizations resulting in millions of dollars of economic loss and requiring weeks for recovery. **Relative likelihood = 4.2.**

Terrorists detonate a radioactive “dirty-bomb” in three metro areas. The detonation would cause: 180 fatalities, 720 injuries and 20,000 contaminations, contamination of 108 city blocks costing billions of dollars and requiring months to years to recover. **Relative likelihood = 4.9.**

Terrorists bomb multiple public sites using improvised explosive devices. The bombings would cause 100 fatalities and 450 hospitalizations resulting in a localized economic impact requiring weeks to months to recover. **Relative likelihood = 5.0.**

Terrorists infect food with anthrax via production plants. The infected food would cause 300 fatalities and 400 hospitalizations, result in millions of dollars economic loss and require weeks to recover. **Relative likelihood = 3.2.**